broski bros.inc
FENCEMASTERS
3915 FULLER / P.O. BOX 31007 / KANSAS CITY, MISSOURI 64129
PHONE 816-861-8000
Wood Fence / Chain Link Fence / Gates / Installation

218

April 25, 1989

Mr. David A. Wagoner
U. S. Environmental Protection Agency
Region VII
926 Minnesota Ave.
Kansas City, Kansas 66101

Mr. Bruce Stewart
Missouri Department of Natural Resources
P. O. Box 176
Jefferson City, Missouri 65102

Gentlemen,

Enclosed are copies of the 1988 Annual Ground Water Monitoring Report for the Broski Brothers Inc./All Brite Galvanizing surface impoundment. "MOT300010972F10001" located at 39th and Belmont in Kansas City, Missouri. This report was prepared by Woordward Clyde Consultants of Overland Park, Kansas.

If you have any questions please contact us.

Sincerely,

Michael J. Broski

Michael J. Broski
President

Enclosures

MJB/dr

A8

5055 Antioch Road
Overland Park, Kansas 66203
913-432-4242

Woodward-Clyde Consultants

April 14, 1989
WCC Project 88C7062-1

Mr. Michael Broski
Broski Brothers, Inc.
3915 Fuller
P.O. Box 31007
Kansas City, Missouri 64129

1988 ANNUAL GROUND WATER MONITORING REPORT
ALL-BRITE GALVANIZING SURFACE IMPOUNDMENT

EPA I.D. No. FMOT300010972

Dear Mr. Broski:

This letter transmits the "1988 Annual Ground Water Monitoring Report" for the referenced facility. The report briefly discusses the 1988 analytical data provided to us as the result of quarterly sampling by Broski Brothers personnel at the facility in 1988. Where possible, the 1988 data are correlated with previous ground water data to highlight changes in ground water quality.

We understand that copies of this report will be submitted by you to the U.S. Environmental Protection Agency and Missouri Department of Natural Resources.

If you have any questions concerning this report, please contact us.

Very truly yours,

Wayne D. Smith

Wayne D. Smith, P.E.
Senior Project Engineer

Dennis Takade

Dennis Y. Takade, Ph. D.
Vice President/Associate

ebd

Enclosure

1988 ANNUAL GROUNDWATER MONITORING REPORT

All-Brite Galvanizing Surface Impoundment
Kansas City, Missouri

INTRODUCTION AND SCOPE

Broski Brothers, Inc. (formerly All-Brite Galvanizing) owns and operates a steel galvanizing plant in Kansas City, Missouri. The galvanizing process uses a sulfuric acid solution (pickling liquor) to strip metals of rust, scale, grease and dirt. Periodically the pickling liquor is replaced and the spend solution is disposed.

From approximately 1977 to 1985, Broski Brothers, Inc. utilized a surface impoundment located at 39th and Belmont Streets, Kansas City, Missouri for storage of spent pickle liquor. This spent pickle liquor was classified as a hazardous waste due to its characteristics of corrosivity.

A ground water monitoring program for the surface impoundment began in 1982. Quarterly sampling of 4 monitoring wells began in June 1982 and continued into 1986 when 13 additional monitoring wells were installed at the site as part of a Ground Water Assessment Program. Since that time, Broski Brothers personnel have performed quarterly sampling of monitoring wells installed at the site.

Closure of the surface impoundment began in 1987 and was completed in 1988. Closure activities included removal and batch treatment of impoundment fluids to obtain freeboard, in-situ neutralization of the remaining fluids, sludge dewatering, placement of a clay cover over the sludge, and revegetation of the site.

This report presents the ground water quality data obtained during 1988 from the monitoring wells installed near the surface impoundment. Previous annual ground water monitoring reports have described in detail the facility location, site geology, ground water flow, and previous ground water quality data.

SUMMARY OF 1988 GROUND WATER MONITORING ACTIVITIES

The ground water monitoring wells located near the former surface impoundment are shown on Figure 1. The monitoring system includes a 3 well cluster located upgradient of the former impoundment (OW-201, A, B, C) and four well clusters located to the west (downgradient) from the facility. The western monitoring wells include OW-208A, C; OW-209A, B, C; OW-210A, B, C; and OW-211A, C. The 'A' designation denotes a shallow depth monitoring well; the 'B' designation denotes an intermediate depth monitoring well; and the 'C' designation denotes a deep monitoring well. All of the wells are installed in the Blue River alluvium that underlies the site.

During 1988, the monitoring wells were sampled by Broski Brothers personnel on April 13, July 14, October 13, and December 13. Samples from each well were submitted to a local analytical laboratory under chain-of-custody and analyzed for pH, specific conductance, dissolved lead, dissolved chromium, hexavalent chromium, total iron, total manganese and total sulfate. Langston Laboratories of Leawood, Kansas performed the chemical analyses for the April 13, 1988 sampling event. Analytical services for all other sampling events were provided by General Testing Laboratories, Inc. of Kansas City, Missouri.

The results of the laboratory analyses conducted during 1988 are included in Attachment 1 and are summarized in Tables 1 through 13.

A review of the four sampling events in 1988 shows that measured concentrations of dissolved lead exceed the current Maximum Contaminant Level (MCL = 0.05 mg/l) of the National Primary Drinking Water Regulations in wells OW-208A (April, October, December), O-209A (December), OW-210A (April, October, December), OW-210B (December), OW-210C (December), OW-211A (December), and OW-211C (December). Additionally, the measured concentration of dissolved lead equalled the MCL of 0.05 mg/l in wells OW-208C (December), and OW-209C (December). The data for 1988 is in contrast to the 1987 data where only 3 wells (OW-208A, OW-210A, and OW-211A) exhibited concentrations of dissolved lead exceeding the current MCL. The

difference in data trends for 1987 and 1988, are believed to lie with the analytical laboratory. The reported values of dissolved lead for the December 1988 sampling event are unusually high for many wells. Samples from wells 208C, OW-209A, OW-209C, OW-210B, OW-210C, OW-211A and OW-211C exceeded the MCL for lead in only the December sampling event. Most of these wells, particularly the C-level wells, have not exceeded the MCL for lead in any prior sampling events. Given the previous data trends, the December 1988 analytical data for lead are considered to be questionable.

The 1988 data shows that measured concentrations of dissolved chromium (total) did not exceed the current MCL of 0.05 mg/l except in wells OW-208A (July) and OW-210A (April, July, October). Well OW-210A has consistently exhibited chromium concentrations that exceed the current MCL. The measured concentration of dissolved chromium for OW-208A in July 1988 was 0.24 mg/l. All other values for 1988 and 1987 were less than 0.02 mg/l. The value reported for July 1988 in OW-208A appears unusually high and is not considered representative of recent trends in the data.

All values reported for hexavalent chromium were less than 0.01 or 0.02 mg/l.

As noted in previous annual reports, there is considerable variability in the reported concentrations of iron and manganese. These analyses are performed on unfiltered samples and the variability in concentration is thought to be influenced by the turbidity of the samples.

Sulfate concentrations continue to exceed the secondary MCL of 250 mg/l in all the wells except the 5 deep (C) wells and OW-201B and OW-209B. OW-210A continues to exhibit the highest concentrations of sulfate with 1988 values ranging from approximately 8,500 mg/l to 24,000. Sulfate concentrations in wells OW-208A, OW-209A, OW-210B and OW-211A typically vary from about 500 to 1,500 mg/l. These values are consistent with previously reported data.

Reported values of pH show wider variation in 1988 than in past years. For many of the wells, the reported pH values decreased with each sampling

event in 1988. No particular significance is realized in this trend given that similar variations were noted in the upgradient well cluster (OW-201). The observed variations in pH data may be the result of a change in analytical laboratories during 1988. Values reported by General Testing are typically lower than those reported by Langeston Laboratories for April 1988 and the 3 sampling events in 1987.

As in the past, the pH values of samples from well OW-201C are typically higher than the other wells. These high values, as noted in the 1987 Annual Report, suggest that cement contamination from the cement-bentonite slurry used during well installation may be influencing the results.

As described in the 1987 Annual Ground Water Monitoring Report, closure of the surface impoundment began in 1987 with in-situ neutralization of the impoundment fluids. The impoundment was backfilled and capped in 1988. With closure of the facility, future water quality data is expected to show a gradual improvement with time in response to the closure activities.

A number of apparent anomalies, potentially related to the analytical laboratory, have been identified in the 1988 analytical data. A careful evaluation of future data is needed to determine if the "anomolous" data represents a trend or is indeed spurious information. It is recommended that at least 1 field blank consisteing of distilled, dionized water be included for metals analysis (dissolved lead and dissolved chromium, pH, and specific conductance) with each sampling event. A second field blank consisting of a blind duplicate sample selected at random from the existing wells should be included with each sampling event for analysis of all parameters. Review of the field blank data should help identify areas that may require improvement (e.g., lab QA, field sampling techniques, etc.).

TABLE 1
OBSERVATION WELL OW-201A
SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.026	< 0.02	< 0.02	0.02	0.029 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	0.013 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.068	4.7	0.05	0.09	2.7 (9/15)
Manganese	0.67	1.26	2.02	1.05	2.1 (9/15)
Sulfate	253	286	316	320	406 (5/12)
pH (pH units)	6.8	6.6	6.61	6.08	6.7-7.2
Specific Conductance (umhos)	900	1,000	870	800	900-2,900

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 2

OBSERVATION WELL OW-201B

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.023	< 0.02	< 0.02	0.06	0.02 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	0.014 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.42	38	3.86	3.71	5.6 (9/15)
Manganese	4.50	6.9	4.95	5.45	5.8 (9/15)
Sulfate	78	< 10	87	9.33	56 (5/12)
pH (pH units)	7.2	6.55	6.10	6.41	6.8-7.1
Specific Conductance (umhos)	750	848	600	620	750-800

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 3

OBSERVATION WELL OW-201C

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.021	< 0.02	< 0.02	0.04	0.036 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 (*)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	<0.02	< 0.02	< 0.01 (*)
Iron	< 0.01	15.7	0.96	< 0.02	0.041 (3/13)
Manganese	< 0.01	3.58	0.43	< 0.01	0.029 (5/12)
Sulfate	14	10	43	5.49	32 (5/12)
pH (pH units)	11.9	8.35	7.30	10.50	11.0-11.8
Specific Conductance (umhos)	1,100	520	460	740	275-1,700

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 4

OBSERVATION WELL OW-208A

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.06	< 0.02	0.06	0.09	0.07 (5/12)
Dissolved Chromium (Total)	0.013	0.24	< 0.01	< 0.01	0.015 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.18	192	0.08	< 0.02	0.182 (15/12)
Manganese	0.40	3.50	1.88	1.53	0.84 (9/15)
Sulfate	1,160	964	1,064	1,069	1,150 (15/12)
pH (pH units)	6.3	6.05	6.17	6.02	6.2-6.7
Specific Conductance (uhmos)	2,300	2,040	18,000	1,600	200-2,200

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 5

OBSERVATION WELL OW-208C

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.014	< 0.02	< 0.02	0.05	0.02 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	0.011 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.23	21	0.89	4.44	4.6 (9/15)
Manganese	0.63	1.08	0.70	0.90	0.78 (5/12)
Sulfate	14	< 10	162	18.7	16 (5/12)
pH (pH units)	7.1	6.6	6.53	6.42	6.8-7.2
Specific Conductance (umhos)	700	740	600	540	690-800

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 6

OBSERVATION WELL OW-209A

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.037	< 0.02	< 0.03	0.06	0.042 (5/12)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	< 0.01	9.9	0.12	< 0.02	0.44 (5/12)
Manganese	0.027	0.23	0.03,	0.09	0.47 (9/15)
Sulfate	294	353	549	542	607 (9/15)
pH (pH units)	6.7	6.5	6.36	6.36	6.6-6.8
Specific Conductance (umhos)	1,150	1,380	13,000	1,100	129-1,300

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 7

OBSERVATION WELL OW-209B

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.014	< 0.02	< 0.02	0.03	0.011 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 (*)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	< 0.01	221	0.25	4.54	3.8 (9/15)
Manganese	3.88	9.10	3.62	4.12	3.9 (5/12)
Sulfate	68	< 10	8.4	19.2	22 (5/12)
pH (pH units)	7.1	6.7	6.62	6.50	6.6-7.2
Specific Conductance (umhos)	650	738	540	500	60-650

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 8

OBSERVATION WELL OW-209C

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.017	< 0.02	< 0.02	0.05	0.014 (9/15)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 (*)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.16	30	1.56	5.27	8.3 (9/15)
Manganese	0.92	1.44	0.98	1.14	0.94 (5/12)
Sulfate	18	< 10	26	28.5	24 (3/13)
pH (pH units)	7.1	6.8	6.36	6.6	6.9-7.2
Specific Conductance (umhos)	700	770	590	520	65-850

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 9

OBSERVATION WELL OW-210A

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.117;0.088	< 0.02	1.42	0.59	0.15 (3/13)
Dissolved Chromium (Total)	0.15;0.031	0.50	< 0.72	< 0.26	0.19 (3/13)
Dissolved Chromium (Hexavalent)	<0.01;<0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	290;1,480	4,500	1,685	4,525	7,270 (9/15)
Manganese	468;103	699	104	232	716 (9/15)
Sulfate	8,480;10,450	8,624	23,595	22,642	29,800 (9/15)
pH (pH units)	4.4; 4.3	3.5	3.66	3.9	3.6-4.4
Specific Conductance (umhos)	14,000;16,000	12,200	140,000	8,400	39,500

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 10

OBSERVATION WELL OW-210B

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.033	< 0.02	0.04	0.14	0.033 (3/13)
Dissolved Chromium (Total)	0.024	< 0.01	< 0.01	< 0.01	0.21 (5/12)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	182	113	146	111	110 (3/13)
Manganese	113	268	111	87	51 (3/13)
Sulfate	564	1,599	1,809	1,395	986 (5/12)
pH (pH units)	6.8	6.1	5.65	5.86	6.4-6.6
Specific Conductance (umhos)	1,600	2,030	25,000	1,800	1,700-1,875

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 11

OBSERVATION WELL OW-210C

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.019	< 0.02	< 0.02	0.06	0.035 (5/12)
Dissolved Chromium (Total)	< 0.01	< 0.01	< 0.01	< 0.01	0.027 (5/12)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	2.77	17.6	2.24	5.53	5.0 (9/15)
Manganese	3.10	1.06	0.82	0.90	1.25 (5/12)
Sulfate	55	< 10	47	28	33 (3/13)
pH (pH units)	7.0	6.75	6.35	6.50	7.0-7.2
Specific Conductance (umhos)	700	730	610	540	700-700

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 12

OBSERVATION WELL OW-211A

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.047	-	0.05	0.11	0.057 (3/13)
Dissolved Chromium (Total)	0.011	-	< 0.01	< 0.01	0.017 (3/13)
Dissolved Chromium (Hexavalent)	< 0.01	-	< 0.02	< 0.02	< 0.01 (*)
Iron	< 0.01	-	0.17	< 0.02	0.052 (5/12)
Manganese	< 0.01	-	0.03	0.07	0.14 (5/12)
Sulfate	731	-	733	643	1,010 (5/12)
pH (pH units)	6.6	-	6.19	6.4	6.4-6.7
Specific Conductance (umhos)	731	-	15,000	1,300	1,900-2,175

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

TABLE 13

OBSERVATION WELL OW-211C

SUMMARY OF 1988 ANALYTICAL DATA

PARAMETER	4/13/88	7/14/88	10/13/88	12/13/88	1987
Dissolved Lead	0.027	< 0.02	< 0.02	0.07	0.026 (3/13)
Dissolved Chromium (Total)	< 0.01	0.03	< 0.01	< 0.01	0.012 (9/15)
Dissolved Chromium (Hexavalent)	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01 (*)
Iron	0.65	17.0	0.75	4.91	5.6 (9/15)
Manganese	4.64	2.84	1.37	1.30	1.2 (3/13, 9/15)
Sulfate	60	< 10	13.2	12.9	10 (5/12)
pH (pH units)	6.9	6.7	6.42	6.35	6.9-7.1
Specific Conductance (umhos)	800	769	550	520	650-700

Notes: All units in mg/l except as noted

Data presented for 1987 represent maximum reported values in 1987 for the date indicated except for pH and specific conductance. The range of values reported in 1987 are presented for these water quality parameters.

*This concentration represents all reported values in 1987.

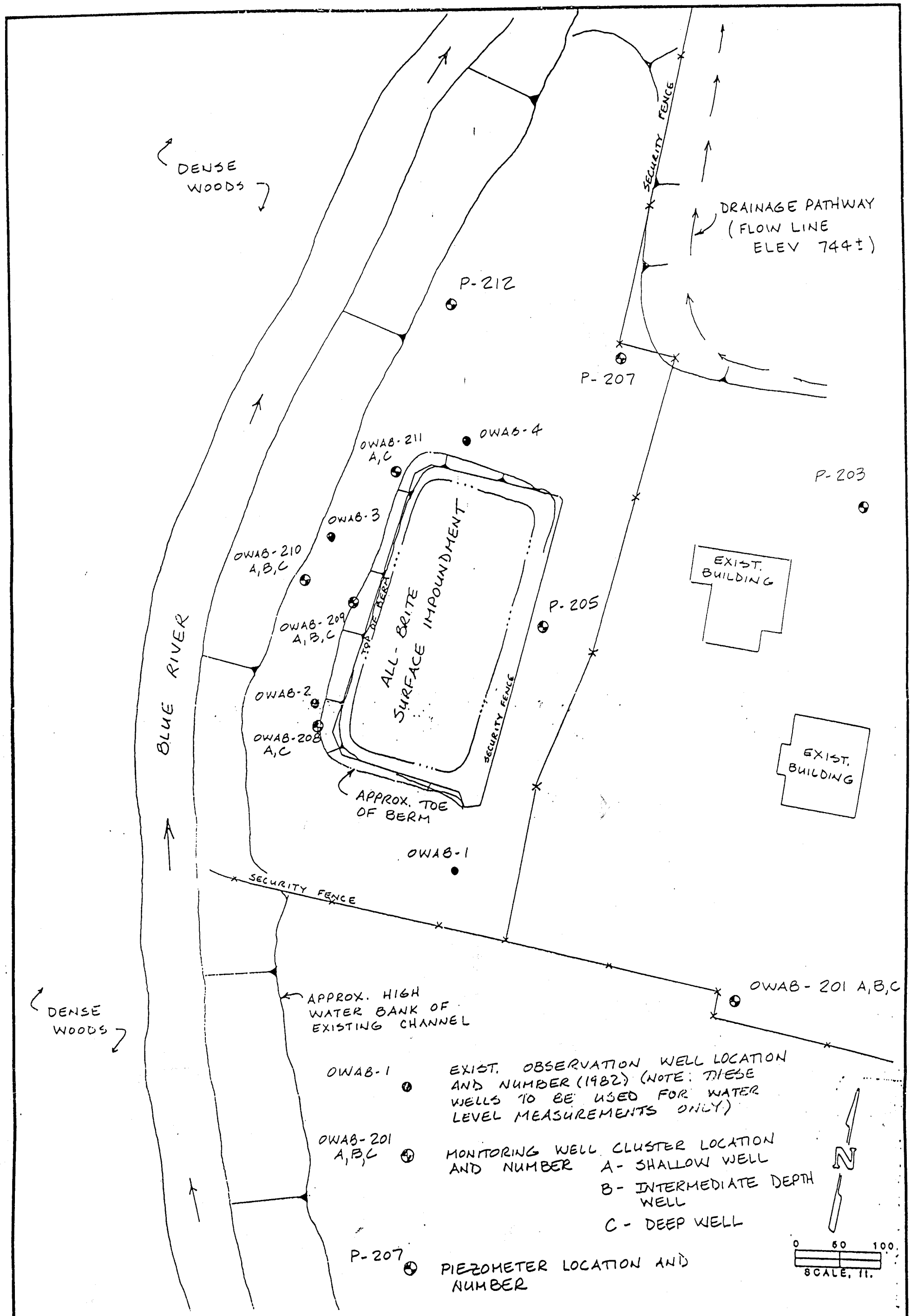

FIG. NO. 1

OBSERVATION WELL AND PIEZOMETER LOCATION PLAN

Woodward-Clyde Consultants

PROJECT NO. 12C049-10

1-22-86

ATTACHMENT 1

LANGSTON LABORATORIES, INC.
Research • Testing • Problem Solving
2005 W. 103rd Terrace (B) • Leawood, KS 66206-2695 • Ph. 913-341-7800

LABORATORY REPORT

CLIENT: Broski Bros., Inc.
P. O. Box 31007
Kansas City, MO 64129
ATTN: Don Tobin

RECEIVED: April 13, 1988 (4:15 pm)
COMPLETED: April 28, 1988
LLI NO.: 88-5877

SAMPLE DESCRIPTION: Broski Bros. Impoundment Groundwater Monitoring Wells Collected by Otis Leaton from 39th & Belmont on April 13, 1988

SAMPLE IDENTIFICATION	ANALYSIS	RESULTS
201 A	pH	6.8
	Specific Conductance	900 µmhos
	Total Lead	0.026 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.068 mg/liter
	Total Manganese	0.67 mg/liter
	Total Sulfate	253 mg/liter
201 B	pH	7.2
	Specific Conductance	750 µmhos
	Total Lead	0.023 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.42 mg/liter
	Total Manganese	4.50 mg/liter
	Total Sulfate	78 mg/liter

APPROVED: Judith A. Russell
Judith A. Russell
Laboratory Manager

SAMPLE DESCRIPTION: Broski Bros. Impoundment Groundwater Monitoring Wells
Collected by Otis Leaton from 39th & Belmont on
April 13, 1988

SAMPLE IDENTIFICATION	ANALYSIS	RESULTS
201 C	pH	11.9
	Specific Conductance	1,100 µmhos
	Total Lead	0.021 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	< 0.010 mg/liter
	Total Manganese	< 0.010 mg/liter
	Total Sulfate	14 mg/liter
208 A	pH	6.3
	Specific Conductance	2,300 µmhos
	Total Lead	0.060 mg/liter
	Total Chromium	0.013 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.18 mg/liter
	Total Manganese	0.40 mg/liter
	Total Sulfate	1,160 mg/liter
208 C	pH	7.1
	Specific Conductance	700 µmhos
	Total Lead	0.014 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.23 mg/liter
	Total Manganese	0.63 mg/liter
	Total Sulfate	14 mg/liter

SAMPLE DESCRIPTION: Broski Bros. Impoundment Groundwater Monitoring Wells
Collected by Otis Leaton from 39th & Belmont on
April 13, 1983

SAMPLE IDENTIFICATION	ANALYSIS	RESULTS
209 A	pH	6.7
	Specific Conductance	1,150 µmhos
	Total Lead	0.037 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	< 0.010 mg/liter
	Total Manganese	0.027 mg/liter
	Total Sulfate	294 mg/liter
209 B	pH	7.1
	Specific Conductance	650 µmhos
	Total Lead	0.014 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	< 0.010 mg/liter
	Total Manganese	3.88 mg/liter
	Total Sulfate	68 mg/liter
209 C	pH	7.1
	Specific Conductance	700 µmhos
	Total Lead	0.017 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.16 mg/liter
	Total Manganese	0.92 mg/liter
	Total Sulfate	18 mg/liter

SAMPLE DESCRIPTION: Broski Bros. Impoundment Groundwater Monitoring Wells
Collected by Otis Leaton from 39th & Belmont on
April 13, 1988

SAMPLE IDENTIFICATION	ANALYSIS	RESULTS
211 A	pH	6.6
	Specific Conductance	1,750 µmhos
	Total Lead	0.047 mg/liter
	Total Chromium	0.011 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	< 0.010 mg/liter
	Total Manganese	< 0.010 mg/liter
	Total Sulfate	731 mg/liter
211 C	pH	6.9
	Specific Conductance	800 µmhos
	Total Lead	0.027 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	0.65 mg/liter
	Total Manganese	4.64 mg/liter
	Total Sulfate	60 mg/liter
102 A	pH	4.3
	Specific Conductance	16,000 µmhos
	Total Lead	0.088 mg/liter
	Total Chromium	0.031 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	1,480 mg/liter
	Total Manganese	103 mg/liter
	Total Sulfate	10,450 mg/liter

SAMPLE DESCRIPTION: Broski Bros. Impoundment Groundwater Monitoring Wells
Collected by Otis Leaton from 39th & Belmont on
April 13, 1988

SAMPLE IDENTIFICATION	ANALYSIS	RESULTS
210 A	pH	4.4
	Specific Conductance	14,000 µmhos
	Total Lead	0.117 mg/liter
	Total Chromium	0.15 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	290 mg/liter
	Total Manganese	468 mg/liter
	Total Sulfate	8,480 mg/liter
210 B	pH	6.8
	Specific Conductance	1,600 µmhos
	Total Lead	0.033 mg/liter
	Total Chromium	0.024 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	182 mg/liter
	Total Manganese	113 mg/liter
	Total Sulfate	564 mg/liter
210 C	pH	7.0
	Specific Conductance	700 µmhos
	Total Lead	0.019 mg/liter
	Total Chromium	< 0.010 mg/liter
	Hexavalent Chromium	< 0.010 mg/liter
	Total Iron	2.77 mg/liter
	Total Manganese	3.10 mg/liter
	Total Sulfate	55 mg/liter

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50 Years of Service

Date August 17 198 8 Number 74334

Sample of Water Revised Report

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 201A

Client Broski Brothers, Attn: Don Tobin

pH	6.60
Specific Conductance	1,000 uohm/cm
Sulfate	286 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	4.7 mg/liter
Manganese	1.26 mg/liter

BROSKI BROS., INC.
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Date August 17 198 8 Number 74334

Sample of Water Revised Report

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 201B

Client Broski Brothers, Attn: Don Tobin

pH	6.55
Specific Conductance	848 uohm/cm
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	38 mg/liter
Manganese	6.9 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water Revised Report

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 20IC

Client Broski Brothers, Attn: Don Tobin

pH	8.35
Specific Conductance	520 uohm/cm
Sulfate	10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	15.7 mg/liter
Manganese	3.58 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water Revised Report

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 208A

Client Broski Brothers, Attn: Don Tobin

pH	6.05
Specific Conductance	2,040 uohm/cm
Sulfate	964 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	0.24 mg/liter
Iron	192 mg/liter
Manganese	3.50 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water Revised Report

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 208C

Client Broski Brothers, Attn: Don Tobin

pH	6.60
Specific Conductance	740 uohm/cm
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	21 mg/liter
Manganese	1.08 mg/liter

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Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 209A

Client Broski Brothers, Attn: Don Tobin

pH	6.50
Specific Conductance	1,380 uohm/cm
Sulfate	353 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	9.9 mg/liter
Manganese	0.23 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 209B

Client Broski Brothers, Attn: Don Tobin

pH	6.70
Specific Conductance	736
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	221 mg/liter
Manganese	9.10 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 209C

Client Broski Brothers, Attn: Don Tobin

pH	6.80
Specific Conductance	770 uohm/cm
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	30 mg/liter
Manganese	1.44 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No:210A

Client Broski Brothers, Attn: Don Tobin

pH	3.50
Specific Conductance	12,200 uohm/cm
Sulfate	8,624 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	0.50 mg/liter
Iron	4,500 mg/liter
Manganese	699 mg/liter

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By Dale Hanna

GTL General Testing Laboratories, Inc.
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50 Years of Service

Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 210B

Client Broski Brothers, Attn: Don Tobin

pH	6.10
Specific Conductance	2,030 uohm/cm
Sulfate	1,599 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	113 mg/liter
Manganese	268 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 210C

Client Broski Brothers, Attn: Don Tobin

pH	6.75
Specific Conductance	730 uohm/cm
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	17.5 mg/liter
Manganese	1.06 mg/liter

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Date August 17 198 8 Number 74334

Sample of Water

Marked Ground water monitoring wells, received in lab 7/14/88, Well No: 211C

Client Broski Brothers, Attn: Don Tobin

pH	6.70
Specific Conductance	769 uohm/cm
Sulfate	<10 mg/liter
Hexavalent Chromium	<0.02 mg/liter
Lead	<0.02 mg/liter
Chromium	0.03 mg/liter
Iron	17.0 mg/liter
Manganese	2.84 mg/liter

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By Dale Foreman

Form 1

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50 Years of Service

Date: November 1 1988 Number: 76185

Sample of: Well Water Marked: 13 Ground Water Monitoring well, /10/13/88

Client: Broski Brothers Inc., Attn: Don Tobin

SAMPLE	pH	CONDUCTIVITY micromhos/cm	SULFATES mg/liter	LEAD mg/liter	MANGANESE mg/liter	IRON mg/liter	TOTAL CHROMIUM mg/liter	HEX CHROMIUM mg/liter
201A	6.61	870	316	<0.02	2.02	0.05	<0.01	<0.02
201B	6.10	600	87	<0.02	4.95	3.86	<0.01	<0.02
201C	7.30	460	43	<0.02	0.43	0.96	<0.01	<0.02
208A	6.17	18,000	1064	0.06	1.88	0.08	<0.01	<0.02
208C	6.53	600	162	<0.02	0.70	0.89	<0.01	<0.02
209A	6.36	13,000	549	0.03	0.03	0.12	<0.01	<0.02
209B	6.62	540	8.4	<0.02	3.62	0.25	<0.01	<0.02
209C	6.36	590	26	<0.02	0.98	1.56	<0.01	<0.02
210A	3.66	140,000	23,595	1.42	104	1,685	0.72	<0.02
210B	5.65	25,000	1809	0.04	111	146	<0.01	<0.02
210C	6.35	610	47	0.02	0.82	2.24	<0.01	<0.02
211A	6.19	15,000	733	0.05	0.03	0.17	<0.01	<0.02
211C	6.42	550	13.2	<0.02	1.37	0.75	<0.01	<0.02

(1)lk

By Dale Hoffman

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1517 WALNUT STREET / KANSAS CITY, MISSOURI 64108 / 816-471-1205

50 Years of Service

Date December 13 1988

Sample of Water Number 77159

Marked Well #201A. Received in lab. 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.08
Specific Conductivity (umhos/cm)	800
Lead	0.02 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	0.09 mg/liter
Manganese	1.05 mg/liter
Sulfate	320 mg/liter

(1) 1k

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50 Years of Service

Date December 13 1988 Number 77159

Sample of Water

Marked Well # 201B. Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.41
Specific Conductivity (umhos/cm)	620
Lead	0.06
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	3.71 mg/liter
Manganese	5.45 mg/liter
Sulfate	9.33 mg/liter

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50 Years of Service

Date December 13 1988 Number 77159

Sample of Water

Marked Well #201C, Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	10.50
Specific Conductivity (umhos/cm)	740
Lead	0.04 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	<0.02 mg/liter
Manganese	<0.01 mg/liter
Sulfate	5.49 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well #208A. Received in lab. 12/2/88

Client Broski Brothers. Attn: Don Tobin

pH	6.02
Specific Conductivity (umhos/cm)	1,600
Lead	0.09 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	<0.02 mg/liter
Manganese	1.53 mg/liter
Sulfate	1,069 mg/liter

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50 Years of Service

Date December 13 1988 Number 77159

Sample of Water

Marked Well #211C, Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.35
Specific Conductivity (umhos/cm)	520
Lead	0.07 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	4.91 mg/liter
Manganese	1.30 mg/liter
Sulfate	12.9 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well #208C, Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.42
Specific Conductivity (umhos/cm)	540
Lead	0.05 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	4.44 mg/liter
Manganese	0.90 mg/liter
Sulfate	18.7 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well # 209B Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.50
Specific Conductivity (umhos/cm)	500
Lead	0.03 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	4.54 mg/liter
Manganese	4.12 mg/liter
Sulfate	19.2 mg/liter

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50 Years of Service

Date December 13 1988 Number 77159

Sample of Water

Marked Well #209A Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.36
Specific Conductivity (umhos/cm)	1,100
Lead	0.06 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	<0.02 mg/liter
Manganese	0.09 mg/liter
Sulfate	542 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well # 209C Received in lab. 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.60
Specific Conductivity (umhos/cm)	520
Lead	0.05 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	5.27 mg/liter
Manganese	1.14 mg/liter
Sulfate	28.5 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well #210C Received in lab. 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.50
Specific Conductivity (umhos/cm)	540
Lead	0.06 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	5.53 mg/liter
Manganese	0.90 mg/liter
Sulfate	28.0 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well # 210A Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	3.90
Specific Conductivity (umhos/cm)	8,400
Lead	0.59 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	0.26 mg/liter
Iron	4,525 mg/liter
Manganese	232 mg/liter
Sulfate	22,642 mg/liter

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50 Years of Service — General Testing Laboratories, Inc. — Est.

Date December 13 1988 Number 77159

Sample of Water

Marked Well #210B, Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	5.86
Specific Conductivity (umhos/cm)	1,800
Lead	0.14 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	111 mg/liter
Manganese	87 mg/liter
Sulfate	1,395 mg/liter

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Date December 13 1988 Number 77159

Sample of Water

Marked Well #211A Received in lab, 12/2/88

Client Broski Brothers, Attn: Don Tobin

pH	6.40
Specific Conductivity (umhos/cm)	1,300
Lead	0.11 mg/liter
Chromium-Hex	<0.02 mg/liter
Chromium	<0.01 mg/liter
Iron	<0.02 mg/liter
Manganese	0.07 mg/liter
Sulfate	643 mg/liter

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